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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,117	11/12/2003	Zhan Gao	MAIKP107US	6226

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EXAMINER
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PAK, SUNG H

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b> 10/706,117	<b>Applicant(s)</b> GAO ET AL.	
	<b>Examiner</b> Sung H. Pak	<b>Art Unit</b> 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 17, 18 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 13-16, 19-22 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1103, 1203</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

Information disclosure statements filed 12/01/2003 and 11/12/2003 have been considered by the examiner.

### ***Claim Objections***

Claims 23 and 25 are objected to because of the following informalities: these claims have identical recitations. One of the two should be cancelled. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 11, 12, 18, 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Mitomi et al (US 2002/0159706 A1).

Mitomi discloses an optical device with all the limitations set forth in the claims, including: a first integrated optical waveguide in an optical substrate (Fig. 2A); a second integrated optical waveguide in the optical substrate (Fig. 2A), the first and second integrated optical waveguides crossing one another at a waveguide crossing in a crossing region of the optical substrate ('22' Fig. 2A); wherein one of the first and second integrated optical

Art Unit: 2874

waveguides has an initial cross-sectional area outside the crossing region and a reduced cross-sectional area in the crossing region (Fig. 2A); the reduced cross-sectional area being smaller than the initial cross-section area (Fig. 2A); wherein the one of the first and second integrated optical waveguides has a smaller width and/or a reduced height in the crossing region than outside the crossing region (Fig. 2A); wherein the one of the first and second integrated optical waveguides has an initial width outside the crossing region, narrows over in the direction of the waveguide crossing in a tapering region of a first defined length in the optical substrate, and expands after the waveguide crossing in an expanding region of a second defined length in the optical substrate to the initial width again (Fig. 2A); wherein the taper of the one of the first and second integrated optical waveguides tapers by an amount of about 15% (paragraph 0121- the spot size controls the width of the waveguides at the crossing section); wherein the taper of the one of the first and second integrated optical waveguides tapers from an initial width of about 6 micron (so that spot size is about 5 micron) by about 1 micron (Fig. 6 illustrates the range of width at the crossing section to achieve various coupling loss); wherein the first and second integrated optical waveguides is routed locally at an increased crossing angle relative to the other of the first and second integrated optical waveguides in the crossing region (Fig. 16)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitomi et al (US 2002/0159706 A1).

Mitomi discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach that the taper lengths of the first and second waveguides are about 400 microns. However, taper waveguides having lengths about 400 microns are commonly used in the art. These taper lengths are considered advantageous and desirable in the art because they constitute suitable path lengths to effectively maintain modal shape of the transmitted optical signal during optical transmission. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Mitomi device to have tapered lengths of about 400 microns.

Claims 17, 23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitomi et al (US 2002/0159706 A1) in view of Okayama et al (JP62027723 A).

Mitomi discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly show the first and second waveguides extending arcuately in the crossing region.

On the other hand, Okayama explicitly discloses first and second waveguides extending arcuately in the crossing region (Fig. 1). Arcuate coupling region is considered advantageous and desirable in the art because it allows for more efficient and less lossy optical coupling between the two optical waveguides. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Mitomi device to have arcuate waveguides in the crossing region.

#### ***Allowable Subject Matter***

Claims 13-16, 19-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: a planar optical circuit having first and second waveguide crossing at a crossing region is known in the art as discussed above. However, none of the prior art fairly teaches or suggests such an optical circuit, wherein the first and second waveguides comprise four linear tapers, wherein the waveguides narrow in the first taper, expands in the second taper, narrows in the third taper, expands again in the fourth taper, and wherein the crossing occurs in the region of second and third tapers as claimed in the instant application.

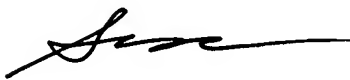
***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,198,860, US 5,157,756, and US 2004/0190830 disclose crossing waveguides with low signal loss and cross talk.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak  
Examiner  
Art Unit 2874